Acoustic Monitoring of Bat Species to Support Multi-Scale Monitoring and Conservation

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With the spread of *Pseudogymnoascus destructans*, the pathogen that causes White-Nose Syndrome, into Montana and the increasing footprint of wind energy and mortality of bats at turbines, Montana's bat species face significant and increasing threats to persistence. Monitoring of species presence and population trend is necessary to assess impacts of these threats and help guide conservation efforts. In 2020 the state, with support from federal agencies and volunteers, conducted surveys using acoustic methods to detect bats at sites across the state. Survey locations were prioritized using the North American Bat Monitoring Program (NABat) sampling grid with four detectors deployed in selected cells over four nights. We surveyed and recorded data at 350 sites within 96 cells and recorded 588,489 call sequences. Automated analysis indicates the detection of 13 species. These data provide information that can be used across management scales. The observations themselves provide managers with confirmation of species presence at the local level and are valuable for project planning. At the regional level these observations can be used to inform species distribution models and explore habitat associations. At the state-wide level analysis of site occupancy and detection probabilities can be used to establish baselines and guide future monitoring to determine trend. As surveys were performed following a national sampling protocol, these data are compatible with other efforts undertaken in states and provinces across the US and Canada as part of the NABat and will be used to provide information on the species across their continental range.